



COMPARATIVE ANTHROPOMETRIC STUDY OF NASAL PARAMETERS IN BELAGAVI ADULT POPULATION

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ABSTRACT **Methods:** A total of Hundred subjects were recruited for this study with age range of 20-35 years. The method applied for measurement was using sliding caliper. The measurements in this study include. NASAL HEIGHT which is measured from the nasion to subnasale, NASAL WIDTH measured at 90 degree angle to the nasal height from ala to ala. NASAL INDEX has been calculated as: Nasal width NW/ Nasal length NH times 100= $NW/NH \times 100$. **Results:** The results showed statistical significant difference between the two genders with the p value of $p < 0.001$. All the three parameters values i.e. nasal height, nasal width and nasal index were found to be higher in males than in females. **Conclusion:** The present study provides the data on nasal parameters which include nasal height, nasal width and nasal index which will be relevant in physical anthropology. Hence in future the study requires larger sample size to get a accurate value and this result is recommended to forensic experts as a tool for identification of persons in the wide range of uncertain human deaths.

KEYWORDS : Nasal height, Nasal width, Nasal index

INTRODUCTION:

The population of India accounts to a whooping 17.84% of world's total population and stands second, only after China. India being domicile for 1.34 billion people which has male to female ratio of about 1000:943. The incidence of mass human deaths in India are mainly due to road accidents, rail accidents, air-crash, terrorist attacks, floods, earthquakes, volcanoes, tsunami, willful riots etc.¹ These situations which alarm entire family of forensic officials or analysts to give a correct identification of gender of a deceased individual. Hence human identification is one of the most challenging topic, that man has confronted.²

Identity of individual human being is unique which is a set of physical characteristics, functional or physic, normal or pathological, that define an individual. Identification of humans is a universal process which is based on scientific principles.³ In India, the scenario is quite different where in we have very few qualified forensic odontologists. Thus, it is important to reinforce and bring awareness about among dental practitioners and to awaken the social responsibility of maintaining dental records of all the patients. This is very essential for identification of individuals in the event of any disaster.³ One of the most important aspects of medicolegal cases and anthropological research or determination of sex and estimation of physical stature of a subject.⁴

In olden era, anthropometry was used in criminology wherever criminals were identified by means of measuring parts of their body. During the early 20th century, one of its primary uses became the attempted differentiation between differences in the races of human.⁵ Anthropometry is that part of science which measure the complete human body and also individual parts eg. face, nose, limb and orbit. Where as nasal anthropometry which measures various parameters related to the nose. It is considered as one of the best clues to racial origin.⁶ The nose is one of the most important upper part of the respiratory tract which help us to perceive and perform smell and breath. As it is a well known aspect that nasal shape includes the, bridge, slope of the tip, septum and nares which do differ from race to race, tribe to tribe and from one environmental region to the other.⁷

Till date there is no study conducted in the North Karnataka region, about nasal parameters. This study aims to assess the nasal parameters of adult population and also to assess the differences in these nasal parameters among men and women in adult population.

MATERIALS AND METHOD:

A total of Hundred (100) subjects were recruited for this study (50 males and 50 females) who visited OPD department of Oral Medicine and Radiology of Maratha Mandal Dental College of Dental Sciences and Research Center Belagavi. Before the starting of the study Ethical clearance was obtained from Institutional review board. All subjects were in the age group ranging between 20-35 years. Subjects who are not ready to give consent, who had history of trauma to the nose, history of plastic or reconstructive surgery of the nose or cleft lips and other congenital facial malformations affecting the nose were excluded from the study.

The method applied for measurement is direct method using sliding caliper with the subject sitting on a dental chair with his or her head in the upright position where the mid saggital plane is at a 90 degree angle to the floor and ala tragus line parallel to the floor. The measurements taken in this study include.

- 1) NASAL HEIGHT, which is measured from the nasion to subnasale.
- 2) NASAL WIDTH, measured at 90 degree angle to the nasal height from ala to ala.
- 3) NASAL INDEX has been calculated as: Nasal width NW/ Nasal length NH times 100= $NW/NH \times 100$. The procedure of measurement used in the study is non- invasive and did not provoke pain discomfort.

The measurement of the nose was done by three different examiners to reduce the subjective bias. Digital caliper was used to reduce the number of errors and also to obtain accuracy. The mean and standard deviation of nasal height, nasal width and nasal index were performed for all patients and subjected for statistical analysis with the Statistical Package for the Social Sciences (SPSS) 16 package programme wherein unpaired t-test was applied to compare these values for both the gender. The descriptive statistics of obtained data were presented by mean and standard deviation (SD). Values of $p \leq 0.05$ were considered statistically significant.

RESULTS:

The Study comprised of 100 subjects (50 males and 50 females) with the age range between 20 - 35 years. There was statistical significant difference between the two genders with the p value of $p < 0.001$. The mean nasal width, nasal height and nasal index values with their

standard deviations and standard errors are shown in Table 1, graph1, graph2 and results in table 2 also shows a statistical significant agreement between the three examiners with excellent agreement for the scores for both nasal height as well as nasal width with the $p < 0.001$.

Table 1: Comparison of Mean height, width and Nasal index in between males and females analyzed by Unpaired t test.

Variable	Gender	N	Mean	Std. Dev.	Unpaired t test	
					T	p-value
Mean height overall	Male	50	36.7	0.45	5.027	<0.001, Significant
	Female	50	31.6	0.55		
Mean nasal width overall	Male	50	18.2	0.36	7.056	<0.001, Significant
	Female	50	13.4	0.33		
Nasal index	Male	50	49.40	6.01	5.824	<0.001, Significant
	Female	50	42.07	6.56		

Interpretation: Males showed significantly higher nasal height, width and nasal index compared to females.

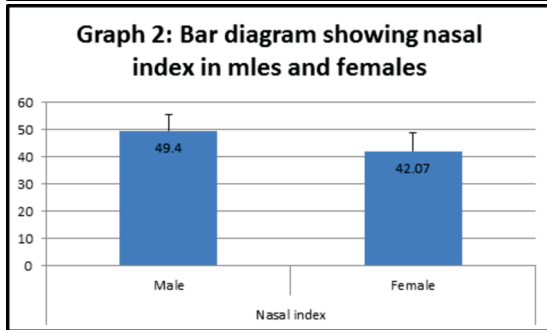
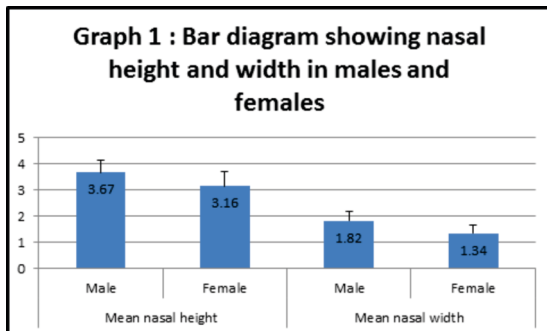


Table 2: Intra-class Correlation Coefficient

Overall	Intra-class Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Nasal height compared between three examiners	0.927	0.900	0.948	38.99	99	198	<0.001, Significant
Nasal width compared between three examiners	0.982	0.975	0.987	163.55	99	198	<0.001, Significant

Interpretation: There was a significant agreement between the three examiners with excellent agreement for the scores for both nasal height as well as nasal width.

The nasal width and heights showed statistically significant results among men and women with the $p < 0.001$. All the three parameters values i.e, nasal height, nasal width and nasal index were found to be higher in males than in females.

DISCUSSION:

Every individual is unique in expressions of his or her body type and related measurements. The scientific method called 'Anthropometry' is used to identify the persons origin on existing physical variability with body measurements.⁸ The Physical anthropometry is valuable in

identification of dead as well as study of living population.⁹ Measurements of face are now commonly used in forensic identification. Nose, being one of the protruded parts of the face, is uneven in its size and shape.¹⁰ The special appearance of the nose are predisposed by the racial influence¹¹ and the ecological type of weather condition.¹²

The nose, which is a most prominent part of the face which is defined, as a facial structure consisting of bones as well as cartilages.¹³ The variation in the definite nasal dimension especially nasal width which happens after skeletal maturity is due to alteration of the microscopic structure of facial soft tissues, alteration of cartilages, muscles, skin elasticity as well as resilience.¹⁴

Geographic regional variation in the nasal parameters differ from one country to another country and within the country as noted by previous literature.^{15,16,17,18}

In our study which we conducted in North Karnataka region Belagavi city, which shows that the mean nasal height of males was 36.7±0.45mm where as in females 31.6±0.55mm. The unpaired t-test were used has the statistically significant ($p < 0.001$). Nasal width of males was 18.2±0.36mm where as in females 13.4±0.33mm and these findings were statistically significant ($p < 0.001$). Mean nasal index of males was more 49.40±6.01mm as compared to females 42.07±6.56mm and which show statistically significant ($p < 0.001$) results. We noted that nasal index of males and females was less when compared to North Indians

In previous literature it has been shown that nasal index was more in studies conducted in North India, than the South Indian population and also North Indian population had higher values of nasal index was noted when compared to South India population.^{16,17,18}

According to Choudary A et al. (2012)¹⁶ in their study they found nasal index of Jats 68.09 ± 6.07 and for Sindhis 70.72 ± 8.12 which shows significant relationship among group of individuals. Sharma SK et al. (2014)¹⁷ conducted a study among north indian hindu community of gwalior region the nasal ergonomics for male and female with mean NI ± SD of 80.59±9.122 in male which was significantly higher ($p < 0.05$) than that of females who has NI ± SD of 77.29±8.472. Ray SK et al. (2016)¹⁸ also shows nasal indices it was observed that the overall male values were 75.866 ± 7.60 higher while that of females was 73.978 ± 7.399.

In South Karnataka people have more nasal height, nasal width and nasal index reported by Girish et al. (2014) nasal index was found to be 84.91 in males and 67.75 in females as compared to our study.¹⁹ Asharani S K et al (2015) in there study also it shows North Indians have 86.7 ± 1.48 have nasal index as compared to South Indians 81.75±12.38 reported also shows less compared to south karnataka.²⁰

In our current study measurements of nasal parameters were greater in males compared to females. These findings were in agreement with studies done by South Indian origin.^{19,20}

CONCLUSION:

This study shows significant differences in nasal parameters among men and women and there is no correlation between age and nasal parameters . The present study provides the data on nasal parameters which include nasal height, nasal width and nasal index which will be relevant in physical anthropology. Hence in future the study requires larger sample size to get a accurate value and this result is recommended to forensic experts as a tool for identification of persons in the wide range of uncertain human deaths.

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